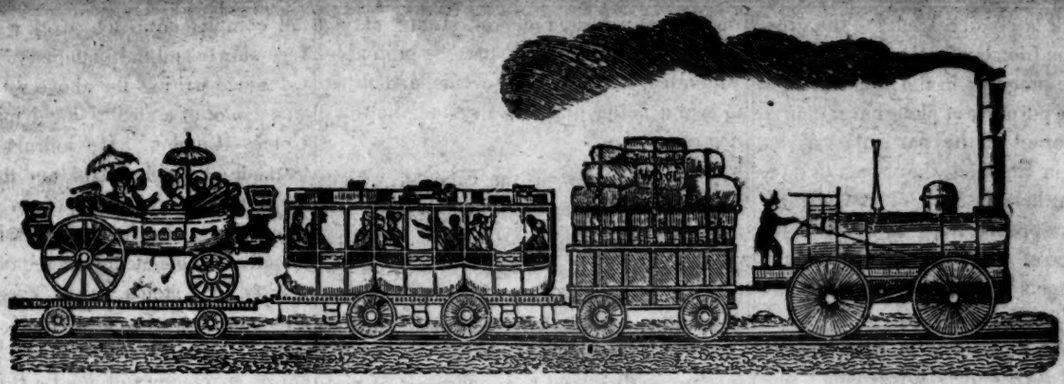


AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT NO. 30 WALL STREET, NEW-YORK, AT FIVE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

D. K MINOR, and GEORGE C. SCHAEFFER, } EDITORS AND PROPRIETORS.] SATURDAY, MAY 13, 1837. VOLUME VI—No. 19.

CONTENTS:

AMERICAN RAILROAD JOURNAL.

NEW-YORK, MAY 13, 1837.

REMOVAL.—The Office of the RAILROAD JOURNAL, NEW-YORK FARMER, and MECHANIC'S MAGAZINE, is removed to No. 30 WALL-STREET, *basement story*, one door from William street, and *opposite the Bank of America*.

☞ SUBSCRIBERS IN THIS CITY, who change their residence on the 1st of May, will please give notice at the office, 30 Wall-street, *Basement Story*. It is desirable that the notice should specify their late and future residence.

Subscribers to, and advertisers in, the *Railroad Journal*, who have not paid the amount due us, will receive our *Circular*, with a *bill* annexed, for the same, *as it appears on our books*. We are fully aware of the difficulty which many subscribers find in remitting so small an amount, and we have, therefore, in many instances, let the accounts stand until they amounted to a sum which might be conveniently remitted by mail—and we now, in consequence of such delays of payment, find it very difficult to continue the publication of the work; and we are under the necessity of saying to those who are indebted, that *prompt payment only* will enable us to complete *the present Volume of the Journal*; we therefore expect every man to remit the amount of his bill *by the earliest possible date*.

☞ If, by any means, *any subscriber has paid, and not been credited* with the amount paid—he will confer a special favor by sending us a *copy of the receipt*, so that we may correct our books, and at the same time know by whom the error was committed. With our best exertions to prevent such errors, they *have occurred*—we will, however, endeavor to avoid a repetition of them.

Subscribers near the Hudson river, and in Philadelphia and Baltimore—will be called upon by our Agent personally,

RAILROADS IN CUBA.—A company has been formed at Puerto Principe to construct a railroad from that to Neuvitas, sixteen leagues distant. Estimated cost, one million of dollars. The engineer is Mr. Edward Huntingdon, from the United States.

IMPROVED RAILWAY.—We have seen models of improvements in the construction of Railroads, made by our townsman, Isaac Cooper. So far as we are capable of judging we give our most decided approbation of the Plan. The objects proposed to be accomplished by Mr. Cooper on his new plan, are cheapness of construction, security against lateral pressure, facility of repairing, and durability of this material, and we think those objects are all attained.

Mr. Cooper has applied for a patent and has now in preparation a full description of his improvements, which will be published in a few days. We refer to this and to his models, as the best means of acquiring a knowledge of the plan.—[Ebensburg Sky.]

THE THAMES TUNNEL.—According to the Report of the Directors at the last meeting of the Thames Tunnel proprietors, the "great bore" has been driven *one hundred and thirty feet* nearer the Middlesex shore since the works recommenced, so that in a short time it is anticipated the lower-water-mark on the Wapping side will be reached, and the completion of the undertaking made a matter of comparative certainty.

MORE RAILROADS.—The Lockport Balance states that the Railroad between Lockport and Niagara Falls commences operation immediately—cars running twice a day each way. The Railroad between Niagara Falls and Buffalo, is put in good order for the season; and as there will be a Railroad from Lewiston to intersect the Lockport and Niagara Falls route, great facilities are offered for intercourse between several important points. In connexion with our Tonawanda Railroad, a track from Batavia to Buffalo or Lockport would give Rochester full enjoyment of the conveniences thereby afforded.—[Rochester Republican.]

APPLICATION OF STEAM TO AGRICULTURE.

Hitherto Agriculture has received little advantage from labor-saving machines compared with that which has been rendered to manufacturers and the mechanic arts; and although many of the implements of agriculture have been greatly improved, especially those great implements, the plough and the thrashing machine, the toil of human hands is still in full requisition; and as great an amount of animal labor as ever, is demanded on our farms. By what means this is to be materially lessened does not at present appear; but when these inventions and discoveries shall have been made, of which at least we will indulge a hope as not being distant, we shall perhaps then be as much surprised at the simplicity of the invention as were the companions of Columbus at his method of causing an egg to stand upon the small end. Profes-

sor Renwick lately deceased,* to the great regret of the friends of science, had made considerable progress in the application of steam to the purposes of ploughing, though we are ignorant of the particulars of his invention; in England they seem to have advanced in this matter, with considerable success, as appears from some accounts given in one of the late numbers of the British Farmers Magazine, from which we copy the following remarks.

"That the steam-engine would, at no very distant day, supply the place of animal labor in agriculture; and become as mighty an instrument in augmenting the productiveness of the soil, as it has proved in creating and economising manufactures, in navigating the ocean, and in travelling on land, was many years since predicted by Franklin (?) a prediction reiterated by Davy; and latterly acknowledged and enforced, as a great desideratum in science by many distinguished agriculturists. The successful application of Mr. Heathcoat's invention to the culture of bogs, the most repellent and obstinate of waste lands, leaves no room to doubt its applicability to soils already in cultivation. Coals are now procurable throughout Great Britain at prices, which have caused the steam-engines to be extensively introduced as a substitute for animal labor in many of the processes connected with agriculture.—Threshing, cleaning, grinding corn, chaff-cutting, and turnip-slicing, &c., are now performed by small engines, fixed on farm premises; even the churn has its steam-engine, managed by the dairy maid; and so great is the advantage arising to the dairy farmer from the regularity of motion; and economy produced by it, that hundreds of small engines, for this simple purpose alone, are used in the north of England and Scotland. But these are humble savings, compared with the benefits to be derived from the vast steam power, which may be applied to the soil itself. Those agriculturists who are acquainted with the effects produced by the valuable sub-soil plough, recently invented by Mr. Smith of Deanston, will readily appreciate the importance of an invention, which will enable them to employ that kind of plough at a much diminished cost per acre. Mr. Smith's plough, with steam-power, will effect a re-revolution in agriculture. Implements o husbandry have hitherto been restricted, in form, weight, and dimensions, to the management of a team of horses. A new class of instruments will take their place. The stiffest soils may be broken up, and pulverised to any desired depth; strong clays, the natural wheat lands, may be profitably cultivated, rendered more fertile, and fitted to bear a better, and more systematic rotation of crops.

Such are a few of the benefits, which land owners and agriculturists will derive from this substitution for animal power in husbandry. It is also no slight advantage, in a national point of view, that this important change will be effected, unaccompanied by any of those temporary evils, which too frequently attend the application of mechanical discoveries to existing arts. This invention will not displace a single individual from his accustomed healthy occupations; it will, on the contrary, occasion new and increased employment for agricultural laborers: it will restore to the support of man a considerable share of that large amount of produce, now sacrificed to the maintenance of agricultural horses; it will furnish employment to the rapidly increasing rural population of the empire, by rescuing millions of acres of bog and waste land from obnoxious sterility; it will find on their native soil multitudes of those Irish laborers, who annually emigrate to Great Britain in search of work and food; or who are forced with numbers of our own countrymen to prefer the dangers and hardships of emigration to wild and distant countries.

In the Mechanics' Magazine for July, there is a notice of a steam-plough, projected by Mr. Dickson, who has no doubt of its efficacy to plough all sorts of land, and adds that portable steam-ploughs will ere long be going about, and undertaking to plough for whomsoever may desire their assistance; and with very little more preparation than is now required to place a portable thrashing machine." An Edinburgh news-paper, states, that "Mr. Craig of that city, has taken out a patent for an American steam-plough, which costs much less than Mr. Heathcoat's, but probably is not sufficiently powerful for bogs. From our knowledge of the business of a farm the only objection we have to a steam-engine in such an establishment is, that it cannot do every thing. For all purposes, where horses cannot or should not walk, as on many descriptions of bog, a steam plough may answer well; and there is no doubt that old arable land may be properly plough ed with steam-power; but would it also take the corn to market and do all other kind of road work. Would it carry out dung; and carry corn to the barn, or hay to the rick yard? If not then some draft horses must be kept; and if there be not a full complement, such work would go on very slowly and unsatisfactory."

"Since writing the above we have seen an account of a steam-plough made by Mr. Upton—London. He affirms that it can be made generally useful, and that an enormous saving in the expenses of a farm where it may be introduced, will soon be manifest. This steam-plough of Upton's is worked by Upton's patent lever steam-engine and his air-furnace boiler. If a single shared plough, the space occupied by the entire machine will be four feet by ten feet; if for trench ploughing, the dimensions will be the same; if for ploughing two, three or more parallel furrows at once then the breadth and length will be about five feet by twelve. The work done by the trenching ploughing, will be equal to any spade husbandry; and that by the parallel shares will be found very superior to any horse ploughing; inasmuch as the ground will not be trod or rammed down by horses feet; and as the steerer and ploughman will ride on the machine, the land will be left as light and open as possible, and resemble that of garden culture. To the steam-plough a harrow, drill, and seed box can be attached, when requisite, and the entire operation performed at one going, when it is for the last ploughing, without trampling the soil. The spots left in the angles of the field by Upton's steam-plough will be smaller than by any horse plough, as the steam-plough will turn if a single share, in thrice the breadth and length of a common wheel-barrow; and if a three shared plough, it will turn in the space of a small one horse cart. The simplicity of construction and small number of parts composing this steam-engine and boiler, and the great safety and security of the latter, will prevent the necessity of frequent and expensive repairs, as the only parts of the apparatus liable to wear and tear are the plough shares, soles, coulters, and harrow tines, which will only require the same repairs as if drawn by horses. The engine and boiler are calculated to go 50,000 miles or more, before any repairs could be wanted, unless from accident or unfair usage; and whenever from long use, very much worn, if the boilers were to burst, it could only extinguish its own fire without injury to any person close to it. The plough will require one steady man to direct and steer it; and a tractable boy to attend the fire and turn the steam off and on occasionally, the engine being of the most simple and efficient construction. The water tank will require replenishing now and then; and perhaps fuel will be required two or three times in the course of the day; and the

* The Report of Professor Renwick's death was, happily unfounded. Eds. New-York Farmer.

boiler is admirably constructed for burning either wood, peat or coke, or coal may be used. The single plough is calculated to do two acres per day. The double plough will do four acres; and the three shared plough will do six acres. The counter or trench plough would do about ten acres per day; but as it would be equal in power to the double shared plough, it would require the same quantity of fuel and expense.—The land cultivated by this plough would doubtless be found, from its efficiency, to produce crops nearly if not quite equal to spade husbandry, with which mode of husbandry I am thoroughly acquainted from practice; and in such case it would pay for the steam the first season."

Such are the accounts, which are given of these great inventions, upon authority, which must certainly be deemed respectable. We may be excused for remaining in some degree incredulous, as to the extraordinary advantages, which are here predicted to be brought about by them. At the same time it would imply a very gross self-esteem to say that no further improvements in this matter can be made; and an unwarrantable distrust of the testimony of other men, though they may be interested parties, to pronounce all there statements fictitious and visionary. We have no doubt that very great improvements in these matters are in progress; and after witnessing the wonderful and almost miraculous results of mechanical ingenuity and skill as applied to other of the arts within a few years past, we indulge the sanguine hope that great things are yet to be realized in this most important of all arts, agriculture, which even our dreams have not anticipated.

Our common ploughs have within a few years passed through most valuable improvements. The use of the cast iron plough has greatly reduced the expenses of their construction and repairs, and has already saved millions of dollars to the farmers in the country. The improved construction of the ploughs has likewise greatly reduced the power required for the draft, and the work is much better executed than formerly. In this matter however great improvements are still desirable.—The manner of our executing our work in general is wretchedly slovenly: and bears no comparison to the ploughing of the Scotch and English laborers. This in part is to be ascribed to the division of labor among them, where a ploughman is only a ploughman, and trained exclusively to this business from his childhood. With us it is not so; but we may hope that these fine examples of work, which these emigrants often set before us, together with the great improvement in the instrument itself, will stimulate to a more vigorous and successful emulation.

H. C.

Navigation.—Our bay and the channel out of the harbor, have been clear from ice for the last day or two, though the lake by us is yet much clogged; but being completely broken up, we hope to be rid of it in a few days.—[Dunkirk Beacon.]

A NEW CONSTRUCTION OF RAILWAYS.

M. Perkins has just exhibited a new plan of railways, which he has secured by patent, and which from the explanation given by him, would appear calculated to supply the desideratum so long desired, and indeed appears to form an era in the progress of those great national undertakings towards perfection.

The plan embraces two modes of construction, founded on one common principle, viz. the continuous support of the rails In the one case this is effected by blocks of vitrified earth, as hard and durable as granite, and which lock into one another, being laid on a concrete foundation: and in the other, by an additional depth of concrete supplying the place of sleepers altogether. Upon the former plan, wooden bearers, four inches in the base, four thick, and two wide, on the top, rest upon the vitrified blocks; and in the latter, upon the concrete, to which they are firmly secured.—In both cases, iron bars, with the means afforded for expansion and contraction, are fixed on the wooden beams, and the foundation being continuous and solid, in fact like one block of granite the whole length of the road, no vibration is felt, as the numerous persons who rode in the wagon unanimously testified; and this is an important attainment in railway constructions. The saving by the plan first described will, it is stated, be full £4000 per mile, in four rows: and by the latter. very much more—in fact so enormous will it be, as to give a new feature to railways, and astonishingly facilitate their construction in all parts of the country. We should much like to see it in practice, which is alone the test: so fallacious are frequently found to be the results when based alone on novelty and experiments.—[Mining Journal.]

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

AN ACCOUNT OF THE NEW OR GROSVENOR BRIDGE OVER THE RIVER DEE AT CHESTER.

Continued from p. 283.

The Act of Parliament under which this bridge has been built was obtained in the session of 1825; the works were contracted for by Mr. James Trubshaw, of Haywood in Staffordshire, early in 1827, and immediately commenced, the son of the contractor being resident throughout; the first stone was laid by the present Marquess of Westminster (then Earl Grosvenor) on the 1st of October in the same year; and the bridge was formally opened on the 17th of October, 1832, by the Princess Victoria, on the occasion of Her Royal Highness's visit to Eaton Hall, and named, at the request of the Commissioners, Grosvenor Bridge, but it was not thrown open to the public generally until New-Year-Day, 1834.

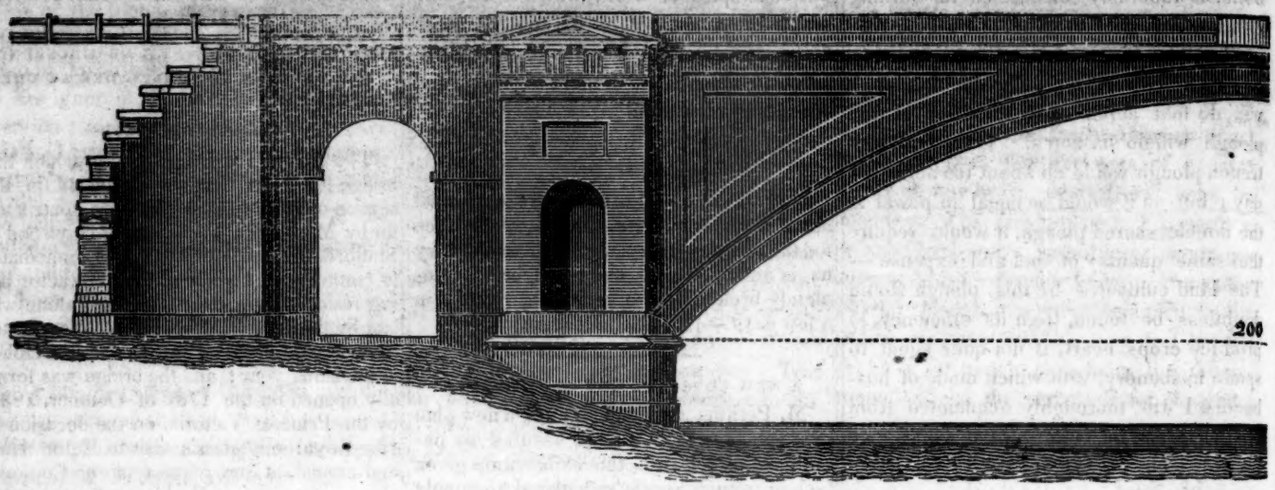
The total cost of the work was £49.900, in which is included a sum of £7500 for the heavy embankments required in the approaches. The money was partly raised by bonds, and partly advanced by the Commissioners for the Loan of Exchequer Bills, and is secured on tolls charged both on the new and the old bridge, the revenue yielded by which is about £3000 a-year.

The following table*, containing the leading dimensions of the largest stone arches that have been built (from 150 feet span upwards), will enable a comparison to be made between the bridge it has been the purpose of this paper to describe, and others approaching but not equalling it in magnitude of arch.

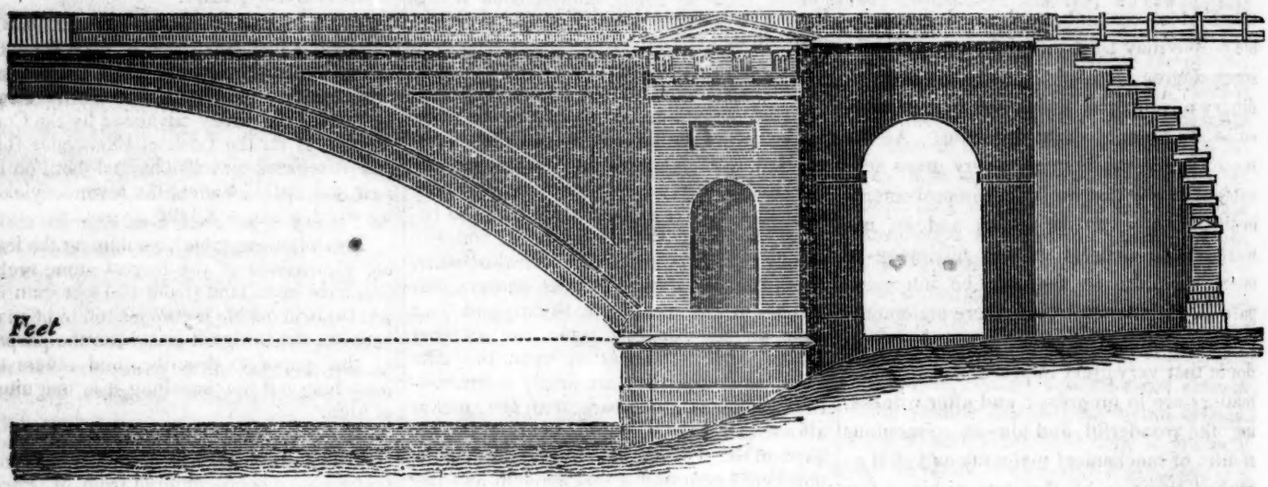
* The dimensions of the continental bridges have been gathered from M. Perronet's *Description des Projets et de la Construction des Ponts*, M. Gauthey's *Traite de la Construction des Ponts*, and Von Wiebeking's *Theoretisch-Practische Wasserbaukunst*; and in the cases of the discrepancies that sometimes occur, (particularly as to the span of the ancient bridge of Vieille Brioude, which is stated to be 183 feet by Perronet, in his bold project for the bridge of Melun, and also as to the rises of some of the other arches,) Gauthey's Work has been preferred, as it seems entitled to be from the character of its talented editor, the late M. Navier, in whose death the Institution has too soon to lament the loss of a valued honorary member.

Name.	River.	Form.	Span.	Rise.	Keystone		Date.	Engineer.
			Feet.	Feet.	Ft.	In.		
Claix (Grenoble)	Drac	Circular	150	54	3	1	1611	
Gloucester	Severn	Elliptical	150	35	4	6	1827	Telford.
London	Thames	Elliptical	152	37½	4	9	1831	Rennie.
Tournon	Doux	Circular	157	65	.....		1545	
Verona	Adige	Elliptica	160	53	.....		1354	
Lavaur	Agout	Elliptica	160	65	10	9	1775	Saget.
Gignac	Erault	Elliptical	160	44	6	5	1793	Garipuy.
Vieille-Brioude	Allier	Circular	178	69	5	3	1454	Grenier and Estone.
Chester	Dee	Circular	200	42	4	0	1833	Hartley.

Plate 6.



CHESTER



BRIDGE.

XV. ON THE STRAIN TO WHICH LOCK GATES ARE SUBJECTED. BY PETER W. BARLOW, CIVIL EN.

Having of late been engaged in estimating the dimensions of timber required for Lock Gates, I have been led to the consideration of the different strains to which they are liable, and the results of my investigations having, in some instances, been rather unexpected and interesting, I beg to lay them before the Institution of Civil Engineers, in the hope that they will prove of utility.

In England of late years, lock gates of large dimensions have been constructed of an arched figure, with a view to increasing their strength; how far an advantage is gained by this construction, it is chiefly the object of the present paper to investigate. Previously, however, to entering into these inquiries, it will be necessary to explain the nature of the strains to which the common straight gate is exposed.

The best angle for the sally of lock gates made of straight timber is a subject which has already engaged the attention of some mathematical men, but I must observe, with respect to those investigations which I have had the means of examining, that they seem to be founded on data evidently incorrect. A common straight gate is exposed to two strains; one a transverse strain, produced by the weight of water at right angles to its surface, which is equal to half the weight applied in the middle; the other a strain in the direction of its length, produced by the pressure of the opposite gate upon its extremity. This latter strain, if the salient angle was of 45°, or the gates stood at right angles to each other, would of course amount to half the weight on the opposite gate, so that at this angle a lock gate has, in addition to the transverse strain, an equal strain in the direction of its length.

Before we can arrive at the angle at which, with given dimensions of timber, the greatest strength will be given to a pair of gates, it becomes necessary to know the amount of transverse strain produced by the end pressure of the other gate; or in a beam loaded in the middle, the additional transverse strain produced by a given degree of pressure applied at the ends. In order to ascertain this point precisely, it would be necessary to have a distinct set of experiments, which would not only be difficult to execute, but very uncertain in their results; and as precision in this point is not necessary to the present question, I think, by the examination of M. Girard's experiments, we may arrive at it sufficiently near for our purpose.

These experiments were made upon a large scale by order of the French government, and although there appears to be some irregularity in the results, I have no doubt they are as correct as the uncertain nature of such inquiries will permit.

The following is an abstract of his experiments on the strength of oak baulks loaded at the end, and with the weight the same timbers would bear loaded in the middle, calculated by the rules given in Barlow's work on timber; by which a comparison can be made of the relative strength when subjected to a direct and transverse strain.

The timbers experimented upon by Girard were not in every case completely broken, but there is no doubt the weight they were subjected to was very little short of that which would have completed the fracture.

TABLE I.—Abstract of GIRARD'S EXPERIMENTS on the Strength of Timber loaded on the End.

No. of experiments.	Dimensions of the Timber. Length.	Breadth.	Thickness.	Weight in pounds the beam bore applied to the extremity.	Weight in pounds the same beam would bear loaded transversely	Ratio.	Remarks.
	FEET.	INCHES	INCHES.				
1	8	6.21	5.03	93616	8598	·092	
2	8	6.39	4.17	94018	6078	·064	Broken.
3	8	6.21	3.99	69165	5390	·078	
4	8	5.23	3.89	50526	4325	·085	Broken.
5	8.628	5.15	4.17	50608	4900	·097	Broken.
6	7.549	6.02	5.15	115359	9980	·087	
7	7.549	6.21	5.05	103799	9909	·095	
8	7.549	6.12	4.085	73095	6396	·087	Broken.
9	7.549	6.21	3.99	63177	6336	·100	Broken.
10	7.549	4.96	3.99	44857	4924	·109	
11	6.471	6.12	5.24	87494	12366	·141	
12	6.471	6.21	5.15	87481	12013	·136	
13	6.471	6.21	3.99	87079	7392	·085	
14	6·471	6.30	3.99	72823	7313	·100	Broken.
15	6.471	5.24	4.17	103622	6525	·063	
16	6.471	5.05	4.25	82261	6674	·081	
17	7.549	6.21	4.25	87443	7022	·080	
18	8.628	6.21	5.32	82332	9607	·116	Broken.
19	8.628	6.21	5.15	103863	8993	·087	
20	8.628	7.37	6.21	137966	15584	·113	
21	8.628	7.45	.21	137866	15764	·114	
					Mean	·996	

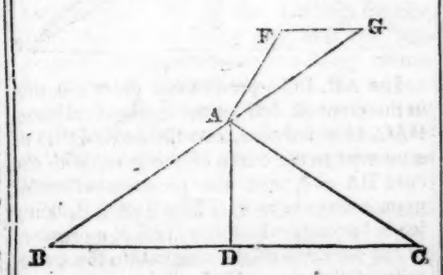
It thus appears that the force required to break a timber in the direction of its length, is about ten times that which would break it if it applied transversely at the middle; from which I infer that the strain in the direction of the gate produced by the pressure of the opposite one, is equal to an additional strain of one-tenth applied transversely.

A difference exists in the comparison made in the preceding Table and in the case of lock gates, which it is necessary to make some remarks upon; viz., that a lock gate has a transverse pressure acting in addition to that produced by the other gate, so that the end pressure is exerted upon it after it is already deflected by a transverse strain which is ot course not the case in the comparison made in the Table. How far this may effect the question, or how much greater effect the compressive force may have in consequence of the beam being already deflected, it is very difficult to determine, but from an examination of the subject, I am induced to think that the deflection is so small as very slightly to increase the effect of the end pressure.

The amount of the effect will of course depend upon the degree of deflection the beam has sustained from the transverse pressure, and if it amounted to a quantity exceeding one-twentieth of the length, (which would make the lever by which the end pressure acted exceed one-tenth of that by which the transverse strain acted,) a greater effect than one-tenth would be produced; but as the ordinary load which timber is expected to sustain, does not produce at the utmost a deflection exceeding one hundredth part of the length, I cannot conceive the transverse strain above named materially to alter the comparison, and I have accordingly, in the following investigation, assumed one-tenth as the amount of additional strain produced by the end pressure of the opposite gate.

It now becomes necessary to get an expression for the amount of the strains above mentioned at any angle of salience, which is arrived at in the following manner:—

Let AB, AC, represent the two gates, meeting at the point A; draw the line AD from the point A perpendicular to BC, and let BD, which represents half the breadth of the lock, $= l$, also



let the pressure of water upon the length l of the gate be indicated by w and the angle $ABD = \varphi$.

Then the length of the AB and any angle φ will be expressed by $l \sec \varphi$

and the pressure upon it by $w \sec \varphi$

The transverse strain produced by this pressure on the centre of the beam at the same angle will be $\frac{1}{2} w \sec \varphi$

It now remains to find the amount of compression in the direction of the gate, produced by the opposite gate.

Let AF represent the force or tendency of the gate AC to turn upon the point C, which is of course equal to half the weight upon the gate A C,

$$\text{or} = \tfrac{1}{2} w \sec \varphi$$

The force may be resolved into AG, FG, the one GF is supported by an equal and opposite force in the gate AB, and the other will represent the force in the direction of the gate, the expression for which may be found as follows;

as sine $\angle$ AGF : AF : : sine $\angle$ AFG : AG

or sine $\varphi : \frac{1}{2} w \sec \varphi : : \cos \varphi : \frac{1}{2} w \sec \varphi$

$$\frac{\cos \varphi}{\text{sine } \varphi} = \tfrac{1}{2} \text{cosec } \varphi$$

The whole amount of transverse strain at any angle φ will therefore be represented by the expression,

$$\tfrac{1}{2} w \sec \varphi + \tfrac{1}{20} w \text{ cosec } \varphi$$

from which we may readily obtain the angle at which the strain is a minimum as follows;

$$\sec + \varphi + \text{cosec } \varphi = \text{min}$$

$$\text{or } \tan \varphi \sec \varphi \, d\varphi - + \cot \varphi \text{ cosec } \varphi \, d\varphi = 0$$

whence $\tan^2 \varphi = \frac{1}{10} \text{ cotan } \varphi$

and $\tan^3 \varphi = \frac{1}{10}$

$$\tan \varphi = \sqrt[3]{\tfrac{1}{10}} = \tfrac{1}{10} \sqrt[3]{100} = .4641$$

$$= \tan \angle 24° 54'$$

The salient angle of a pair of oak gates, when the strain is a minimum, is therefore 24° 54′

In the question of the best angle for lock-gates, it becomes necessary to consider that the length of the gate also varies as the secant of the angle φ. The angle 24° 54′ is therefore not that at which, with a given section of timber, the greatest strength will be obtained; for although the strain is the least at this angle, yet the gates, by their greater length, are less able to resist it than at some intermediate angle, when the strain is slightly increased. The expression now becomes

$$\sec^2 \varphi + \tfrac{1}{10} \sec \varphi \text{ cosec } \varphi = \text{min}$$

$$2 \sec^2 \varphi \tan \varphi \, d\varphi + \tfrac{1}{10} (\tan \varphi \sec \varphi \text{ cosec } \varphi - \cot \varphi \text{ cosec } \varphi \sec \varphi) = 0$$

$$2 \sec \varphi \tan \varphi + \tfrac{1}{10} \tan \varphi \text{ cosec } \varphi = \tfrac{1}{10} \text{ cotan } \varphi \text{ cosec } \varphi$$

$$2 \sec \varphi \tan^2 \varphi + \tfrac{1}{10} \tan^2 \varphi \text{ cosec } \varphi = \tfrac{1}{10} \text{ cosec } \varphi$$

from which the cubic equation,

$$\tan^3 \varphi + \tfrac{1}{20} \tan^2 \varphi = \tfrac{1}{20}$$

This, being reduced, makes the tan. = .25701, or the angle 19° 25′, at which a pair of lock-gates should be situated, so as to have the greatest strength with a given section of timber.

Having obtained, in a manner I hope satisfactory, the angle of greatest strength for gates of straight timber, I conclude this part of my paper with a Table of the necessary dimensions of oak timber for lock-gates, varying from 6 to 20 feet in length, and from 8 to 20 feet in depth, which I believe are the limits of the dimensions of gates of this construction.

The first column in each division of the Table gives the amount of transverse strain produced by the pressure of water upon three feet depth of surface, at an angle of 19° 25′; and the second column the dimensions of square oak timber necessary to bear three times that strain.

TABLE II.

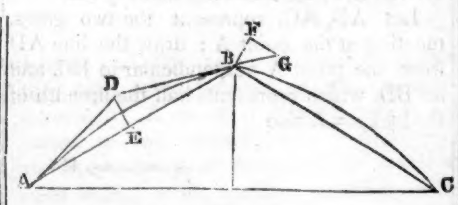
Length of Gate.	6 FEET DEEP. Strain produced by the pressure upon 3 feet surface.	6 FEET DEEP. Dimensions of Square Timber necessary to bear three times that strain.	8 FEET DEEP. Strain produced by the pressure upon 3 feet surface.	8 FEET DEEP. Dimensions of Square Timber necessary to bear three times that strain.	10 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	10 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.	12 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	12 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.	14 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	14 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.	16 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	16 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.	18 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	18 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.	20 FT. DEEP. Strain produced by the pressure upon 3 feet surface.	20 FT. DEEP. Dimensions of Square Timber necessary to bear three times that strain.
FEET.	TONS.	IN.	TONS.	IN.	TONS.	IN.	TONS.	IN.	TONS.	IN.	TONS.	IN.	TONS.	IN.	TONS.	IN.
5	1.601	4.86	2.134	5.35	2.668	5.77	3.202	6.13	3.735	6.45	4.269	6.74	4.803	7.01	5.336	7.26
6	1.921	5.49	2 561	6.05	3.201	6.52	3.842	6.92	4.482	7.29	5.123	7.62	5.763	7.93	6.403	8.21
7	2.241	6.09	2.987	6.70	3.735	7.22	4.483	7.67	5.229	8.07	5.976	8.45	6.724	8.78	7.470	9 10
8	2.561	6.66	3.414	7 32	4.268	7.89	5.123	8.39	5.976	8.83	6.831	9.23	7.685	9.60	8.538	9.94
9	2.882	7.20	3.841	7.92	4.802	8.54	5.763	9.07	6.723	9.55	7.684	9.98	8.645	10.38	9.600	10.75
10	3.202	7.72	4.268	8.50	5.336	9.16	6.404	9.73	7.470	10.24	8.538	10.71	9.606	11.14	10.672	11.54
11	3.522	8.23	4.695	9.06	5.869	9.76	7.044	10.37	8.217	10 92	9.392	11.41	10.566	11.87	11.739	12.30
12	3.842	8.72	5.122	9.60	6.402	10.34	7.684	10.98	8.964	11.57	10.246	12.10	11.526	12.58	12.806	13.03
13	4.162	9.20	5.548	10.12	6.937	10.90	8.325	11.59	9.711	12.20	11.099	12.76	12.488	13.27	13.874	13.74
14	4 482	9.67	5.974	10·64	7.470	11.46	8.966	12.18	10.458	12.82	11.952	13.40	13.448	13.94	14.940	14.44
15	4.803	10.12	6.402	11.14	8.064	12.00	9.606	12.75	11.205	13.42	12.807	14.03	14 409	14.55	16.008	15.12
16	5.122	10.56	6.828	11.63	8.536	12.53	10.246	13.31	11.952	14.01	13.662	14.65	15.370	15.24	17.076	15·78
17	5.443	11.00	7.255	12.11	9.071	13.05	10.887	13.86	12.699	14.60	14.514	15.26	16.330	15.86	18.142	16.43
18	5.763	11.43	7.683	12.58	9 603	13.55	11.526	14.40	13.446	15.16	15.369	15.85	17.289	16.48	19.209	17.07
19	6.083	11.85	8.109	13.04	10.138	14.04	12.167	14.93	14.195	15.72	16.222	16.43	18.251	17.09	20.277	17.70
20	6 404	12·26	8.536	13.49	10.672	14.54	12.808	15.45	14.940	16.26	17.076	17.00	19.212	17.68	21.344	18.31

In making use of the above Table, for obtaining the necessary dimensions of the lower timbers, it has to be considered that a great support is afforded by the sill of the Gate, which will of course permit with safety the use of less timber than the Table will give. The influence of this support cannot, however, extend beyond the second timber from the bottom, as the deflection of the planking will allow the whole of the pressure to be effective.

Curved Lock Gates.

In locks of large dimensions in this country, a curved figure is given to the gates, so that when united they resemble a Gothic arch; this figure, by giving greater strength permits a reduction to be made in the dimensions of the timber, and the gates are thereby rendered lighter, and more readily movable. The degree of curvature which will give the greatest strength, and the necessary dimensions of the timber in different sized locks, are of course points of considerable importance, not only on the score of economy, but from the greater degree of lightness that may be thus obtained; the opening and shutting can be performed with greater ease, and consequently a greater number of ships can be permitted to pass in a given time.

In order to estimate the degree of curvature which will give the greatest strength, it is first necessary to consider the nature and amount of the strains to which the Gothic shape gives rise, we may then perceive what variations, with respect to the degree of curvature and amount of salience, will tend to increase the strength, or vice versa.



Let AB, BC represent two gates meeting in the point B, and let the angle of salience, BAC, be equal to φ, also the angle DBE of a tangent to the curve of the gate, with the cord BA $= \theta$, and the pressure of water upon each gate $= w$. The gate AB, being loaded equally all over, will exert a pressure in the direction of the tangent, to the extremity of the gate, which will be represented by the line DB, (the perpendicular DE being equal to $\frac{1}{2}w$,) or equal $\frac{1}{2}w$ cosec θ.

This force is partly resisted by the compressive force of the opposite gate, which now, instead of adding to the transverse strain, as in the straight gates, is the means of diminishing it in proportion as it counteracts or destroys the tangential force DB. In order therefore to estimate the amount of strain, it becomes necessary to get an expression for this force, which may be done as follows. Let BF represent the force acting at right angles to the extremity of the gate BC, tending to turn it upon the point C, which is of course equal to half the pressure of water. Resolving this into the direction of the tangent of the curve AB, by drawing FG parallel to BC, and producing DB, we obtain the line BG, which represents the compressive force of the gate BC in the direction of the tangent DB, and which is equal $\frac{1}{2}w$ cosec $(2\varphi - \theta)$.

As the diminution of strain owing to this force is, in proportion it destroys the tangential force DB, the amount of the transverse strain at any angle, φ and θ may be found by the following proportion:

$$\tfrac{1}{2}w \operatorname{cosec}\theta : \tfrac{1}{2}w\,\{\operatorname{cosec}\varphi - \operatorname{cosec}(2\theta -)\} :: \tfrac{1}{2}w : x$$

$$\text{Or, } x = \frac{\tfrac{1}{2}w\,\{\operatorname{cosec}\theta - \operatorname{cosec}(2\varphi - \theta)\}}{\operatorname{cosec}\theta}$$

$$= \tfrac{1}{2}w\left\{1 - \frac{\operatorname{cosec}(2\varphi - \theta)}{\operatorname{cosec}\theta}\right\}$$

$$= \tfrac{1}{2}w\left\{1 - \frac{\sin\theta}{\sin(2\varphi - \theta)}\right\}$$

which is the true expression of the transverse strain or weight applied transversely in the middle of the length, which would have equal effect in breaking the timber.

It will at once be seen that when the gates united from a complete arch, that is, when the angles φ and θ become equal, the expression vanishes, the tangential force being then resisted by an equal compressive force in the opposite gate.

In this position, therefore, if the curve was mathematically true, the strain perfectly equal and regular, and the material also of an uniform density, the loading the arch would have no other effect than that of direct compression in the direction of the fibres, a description of strain which timber possesses great power to resist, as appears from the experiments of Girard. In practice this cannot, however, take place; the curve can neither be perfectly true nor the density of the material uniform, either of which defects would lead to a transverse strain, which, if sufficient weight was put on, would ultimately destroy the gate. In the former case, the flatter parts of the curve would naturally have a transverse strain upon the bottom fibres, from the abutments or terminations of it not being resisted with an equal degree of compressive force; the fibres would in consequence in some measure yield, and the relative position of the gates at the point of meeting would be changed, so as not to touch equally throughout; an increased compression would be brought upon particular fibres, which must of course yield, and the evil would continue to increase until fracture ultimately took place. In a similar manner, an irregular density of the material, by causing a yielding in some parts more than others, would bring on a change of shape which would ultimately produce the same results.

It therefore appears that in either case the cause which ultimately leads to fracture is the transverse strain produced from the irregularity of the curve, brought on by circumstances which cannot be controlled. Hence the nearer the curve can be preserved in the true figure of an arc of a circle, the greater the strength of the gates.

It has however to be considered that the

arch is not composed of one complete timber, but that the fibres are disunited at the point of meeting, and consequently if that part from any cause should become flattened there are no fibres to resist the transverse strain thus produced; and as the flattening of this part of the arch is an effect which might probably arise from any yielding of the abutments, or wear of the heel posts in the hollow quoin, this would evidently be the weakest part of the curve. It therefore becomes necessary to deviate in a small degree from the true curve of the arch, by giving the gates greater length, and causing them to meet at a point a short distance from the curve, or in fact rendering them slightly Gothic; but as the security to the point is obtained at the expense of a constant transverse strain upon each of the gates, the deviation from the true arched figure should be as little as possible, consistently with the object in view, and by no means so great as is commonly employed in lock gates: I should think a deviation of one foot or eighteen inches quite sufficient for the purpose of locks of from forty to fifty feet wide.

General Remarks.

It was my intention to have concluded the preceding part of the article with a Table of the requisite dimensions of timber for gates of different sizes, both of the curves commonly employed, and of those which I should recommend; I find, however, that these calculations would require a greater length of time than I can at present devote to the subject, and I therefore conclude with a few general remarks on the results arrived at.

In the first place, with respect to the proper angle of straight gates, this being a subject naturally calculated to excite the propensities of the mathematician to set his maxima and mimima to work, a great number of solutions to the problem have been given; but I must remark, with every respect for that useful class of men, that they are frequently too anxious to commence investigations without sufficient data, and consequently arrive at results totally incorrect, which has certainly been the case in those investigations I have had an opportunity of examining on the subject.

It seems to me perfectly impossible to arrive at correct results, without first ascertaining the amount of transverse strain produced by the end pressure, which does not seem to have been done before; but having obtained this from Girard's experiments to be one-tenth of the effect of an equal weight in the middle of the length, I have little doubt that the angle 19° 25′ would be found, by experiments, to be very nearly that in which the greatest strength would be obtained with a given quantity of timber.

The angle commonly adopted in this country, is considerably more than 19° 25′, amounting generally to between 30 and 40 degrees, which is said to be preferred from the direction of the thrust being met by a large quantity of brickwork. I cannot, however, conceive this to be a matter of much importance, particularly as there are locks on the continent, of large dimensions, where the angle is considerably less, which have stood perfectly well. The angle of the celebrated sea-lock of Muyden is only 16° 30′, and the ancient lock of Sparendam, which was built in 1568, and has stood many storms without injury, has a sally of not more than one-sixteenth:—the angle ought certainly to be in some measure guided by the circumstances in which the gate is placed; at the same time, I consider the angle commonly made use of in England, to be decidedly larger than necessary, and a useless weight of material employed, which increases one of the evils of canal navigation,—the time consumed in passing the locks

The employment of curved timber is undoubtedly advantageous, but its application is evidently made upon no fixed principles, as may be seen from the differences of the curves which have been adopted; some being so great as to very nearly approach the figure I have pointed out as the best, while others are so exceedingly flat that they possess little advantage over the straight gate.

To illustrate these differences in wooden gates, I have represented, in the accompying drawing, the curves employed in the gates of the St. Katharine's, London, and West India Docks. The dimensions are as follows:—

ST. KATHARINE'S DOCKS.

Width of the lock	45 feet.
Projection	11
Radius of the gate	117

Consequently the angle $\varphi = 29° 16'$, and $\theta = 6° 8'$.

LONDON DOCKS.

Width of the lock	40 feet.
Projection	9
Radius of the gate	50

Angle $\varphi = 23° 35'$, and $\theta = 13° 54'$.

WEST INDIA DOCKS.

Width of lock	45 feet.
Projection	10
Radius of the gate	120

Angle $\varphi = 26° 24'$, and θ 5° 53′.

With the aid of the preceding formulæ I have calculated the amount of transverse strain in each case, (half the pressure of water upon one gate being unity,) and the same, if they were of straight timber, having an equal salient angle. These formulæ are arranged in the following Table.

In order to make the comparison of the straight and curved gate more direct, there is also added a column of the amount of transverse strain on the latter, that on the straight gate being unity.

The fourth column illustrates the reduction of the dimensions of square timbe which may be permitted owing to the diminished strain.

TABLE III.

Gate.	Transverse strain, $\frac{1}{2} w$ being unity.	Transverse strain of straight timber having the same salient angle, $\frac{1}{2} w$ being unity.	Transverse strain, that on the straight gate being unity.	Dimensions of timber having equal strength, that on the straight gate being unity.
At St. Katharine's Docks,	·86	1.178	·73	·900
London Docks,	·56	1.229	·45	·766
West India Docks	·86	1.201	·72	·806

It thus appears that considerable advantage is gained in each case from the curvature, but that in the London Docks, from the radius being less, and the two gates in consequence approaching nearer the curve of a complete arch, the advantage is much greater, and the transverse strain in consequence reduced to less than half that of straight gates having the same salient angle.

The difficulty of obtaining timber of sufficient curvature has been urged as a reason for the flatness of the curves employed in wooden gates; this is certainly a consideration which must be attended to, but as similar curves are employed when the material made use of is cast iron, I cannot conceive this to be a point which has materially influenced the choice of the figure.

In the accompanying drawing (Plate VII.) are given the curves of the gates of the Caledonian Canal, the Dundee Docks and Sheerness Basin, which are of cast iron: they will be found to differ very materially from each other, being in one instance nearly as flat as in the West India and St. Katharine's Docks.

The following are the dimensions:—

CALEDONIAN CANAL.

Width of the lock	40 feet.
Amount of projection	10 "
Radius of curvature	75

Angle of sally $\varphi = 30°$, and $\theta = 8° 3'$

DUNDEE DRY DOCKS.

Width of entrance	40 feet.
Amount of projection	7 feet 6 inches.
Radius of curvature	67 feet.

Angle of sally $\varphi = 22° 2'$, and $\theta = 9° 12'$,

SHEERNESS BASIN.

Width of entranec	58 feet.
Amount of projection	12 feet 6 inches.
Radius of curvature	55 feet.

Angle $\varphi = 24° 5'$, and $\theta = 16° 55$.

To make a comparison of these curves, I have calculated a Table, as in the case of the wooden gates, containing the amount of the transverse strain which straight gates would have under similar circumstances.

The same formula is employed for this purpose as for the wooden gates, which may not be stricly true with cast iron; but I should not conceive the difference to be sufficient to affect materially the comparison.

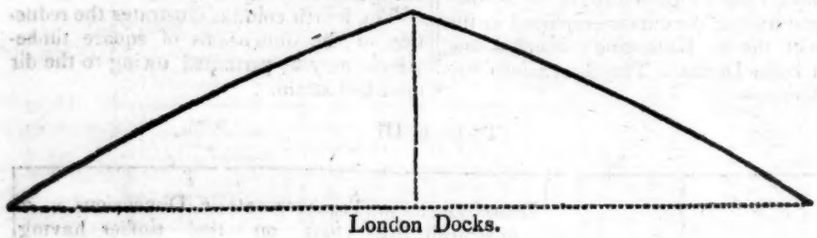
Gate.	Transverse strain, half the pressure of water being unity.	Transverse strain of a straight gate, with the same salient angle.	Transverse strain, that of the straight gate being unity.	Dimension of iron of similar section with the straight gate, that of the latter being unity.
At Caledonian Canal	·82	1.173	·700	·887
Dundee Docks	·72	1.247	·58	·834
Sheerness Basin	·44	1.215	·35	·704

It thus appears that in the gates of the Caledonian Canal the transverse strain is nearly as great as in the West India and St. Katharine's Docks. In those of the Dundee Docks and Sheerness Basin, a considerable improvement is made, particularly in the latter, where the strain amounts to little more than one-third of that which straight gates would have in the same situation; but I conceive that yb slightly diminishing the salient angle, and increasing the curvature of the gates, the advantage might be carried still further,—the same strength produced by less weight of material, and a lightness given which would greatly facilitate the passing and repassing of vessels.

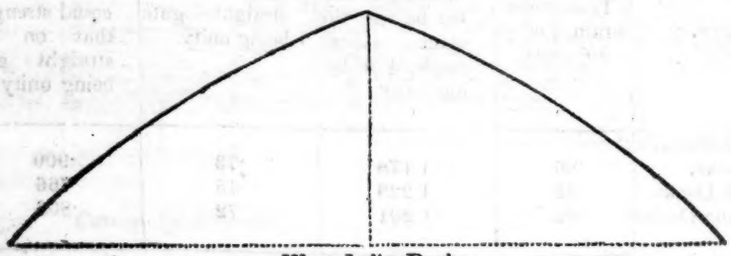
CURVES OF LOCK-GATES.

Plate 9.

St. Katherines Docks.

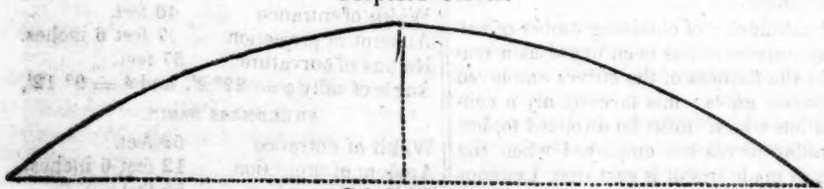


London Docks.

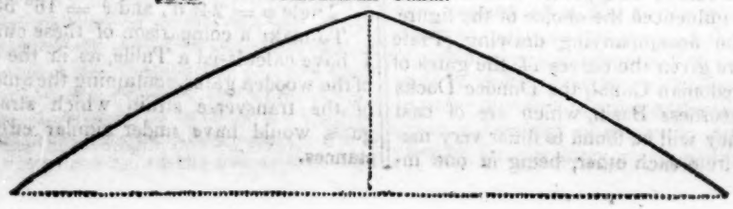


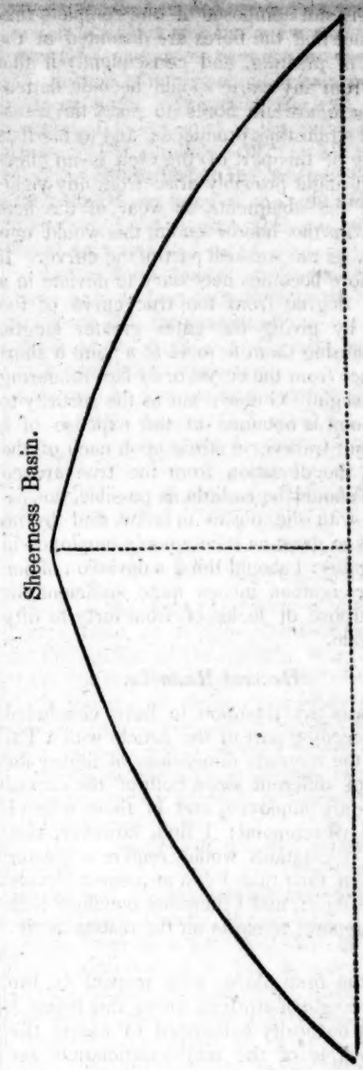
West India Docks.

Proposed Curves.

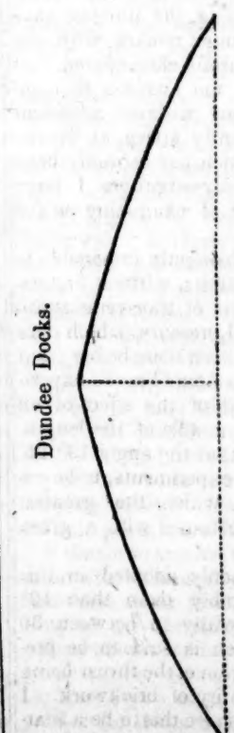


Caledonian Canal.





Sheerness Basin.



Dundee Docks.

Agriculture, &c.

CULTIVATION OF THE PRAIRIES. The following letters from, and to, the Hon. H. L. Ellsworth, superintendant of the Patent Office at Washington city, give a better idea of the cost of cultivating the Western Prairies than we have before seen, and we think our readers generally will be pleased with a perusal of them.

WASHINGTON, Jan. 1, 1837.

Dear Sir—You doubtless expect some further statement than has been received respecting the investment made for you in the valley of the Wabash. A desire to meet my son, who was daily expected from Lafayette, has delayed my writing until this time. And now, let me say, generally, that the west has grown, and will continue to increase beyond the most sanguine calculations. Nor will any action of general government materially check the advancement of the lands which are judiciously located on the great western canals or railroads. Very little is yet known of the valley of the Wabash. Although the fertility of the soil is unequalled, still few have ever seen this country. The reason is obvious, there is no communication with it, and hence speculators and settlers have passed around it going west, either by the Michigan Lake, or by the Ohio and Mississippi rivers.

Five thousand persons left Buffalo in one day to go up the lake, and yet not one went into the valley of the Wabash. A slight inspection of the maps of Indiana, Ohio, and Illinois, will show a direct route to the Mississippi from the west end of Lake Erie, to be up the Maumee and down the Wabash valley to Lafayette. It may, therefore, be considered certain that when the railroad from St. Louis to Lafayette is completed, the great travel from the Mississippi valley to the east, will be by the lakes through the Wabash and Erie Canal the shortest and quickest route by several days. A person at the mouth of the Ohio will pass up to St. Louis, then take the railroad and canal to Lake Erie, in preference to following the meanders of the Ohio river in a steamboat. Can there be a doubt on this subject? What time will be occupied on this route to New-York? Not exceeding six days. From St. Louis to Lafayette, (240 miles,) one day may be allowed; from Lafayette to the lake, at the rate of 4½ to 5 miles per hour on the canal, (now in operation considerable part of the way,) forty-eight hours; on the lake, 24 hours; and from the lake to New-York city, via railroad, (now commenced,) not exceeding two days.

What changes this must make in the value of property on the route! The value of land depends on the fertility of the soil and the facility of transportation. From a personal inspection of the western States, during six years past, I am fully convinced the Wabash valley has the best soil and most favorable climate. In the latitude of Philadelphia, you avoid the extreme of great heat in summer and of cold in winter, and also avoid the danger of early frosts, so prevalent in a higher latitude. You may ask, what will be the markets for Indiana? I answer, New-York and New-Orleans.—The former by the Erie Canal, and the latter by the Wabash river, (navigable to Lafayette for steamboats,) and by the railroad above named to St. Louis, also Montreal by the Welland Canal. A choice of all these markets, equally accessible, is presented to farmers on the Wabash valley; and one peculiar advantage this valley possesses over Michigan and Wisconsin, is the early navigation of the Wabash river. The produce of this valley can by this river pass down to New-Orleans in flat boats, free of tolls, and be transported to Charleston, Baltimore, New-York, and Boston, six weeks before the New-York canal opens. This early market may be estimated at a good profit in business.

You may ask, if the Wabash and Erie Canals will surely be completed? Undoubtedly they will. Indiana and Ohio are pledged to complete them. Nearly all is now under contract, and government has given lands adjoining sufficient to finish the same, *without any expense to the States.*

As like causes (other things being equal) produce like effects, it will not tax your credulity to believe, that the rich lands of the Wabash valley will equal those on the Ohio, New-York, and Pennsylvania canals which vary from $25 to $60 per acre. Is it possible that lands, yielding forty bushels of wheat, seventy bushels of corn, sixty bushels of oats, and four hundred and fifty bushels of potatoes, and distant only ten to twelve days transportation from New-York or New-Orleans cities, can be less than $30 per acre?

In making selections, I have, when practicable, procured both prairie and timber, though I am sure there has been a common error to pass the rich prairie because timber cannot be found adjoining, at government price. Under this belief many settlers have, to their sorrow, entered the timber and left the prairie, because they suppose nobody would enter that without possessing the timber. This prairie has been lately entered. And such is the facility of raising timber on prairies by sowing the seed of black walnut and locust, that the desire for timber land has diminished.—Those who doubt the comparative value of prairie and timber land., will do well to consider that $12 is a fair price for clearing timber land. Timber land when cleared in the usual manner, is left incumbered with stumps and roots, fatal obstacles to labor-saving machines. $12,000 will be required to clear 1,000 acres of timber land; whereas the 1,000 acres of prairie can be put into tame grass, without ploughing.

A prairie farm may be put in complete cultivation, at from $3 75 to $9 per acre, according to the annexed computations from my son Edward, who has been extensively engaged in cultivating the prairie for the last year. The annexed letter from Mr. Newell will also give much valuable information on this point. From a personal examination of the lands in France and on the Wabash valley, I feel no hesitation in pronouncing the latter decidedly the best for the beet sugar manufacture.—In France, eight, ten, and twelve dollars per acre are paid for rent, and yet great profits are made. An acre of good land will yield 44,000 pounds of sugar beet, from which 2,400 pounds of sugar can be extracted, which at ten cents per pound, amounts to $240 per acre.

In England, paper is now made from the residuum of beets, after the saccharine matter is extracted. An application for a similar patent is now pending in the patent office. The sample of paper exhibited is very good, and the rapidity with which the paper is made, must materially reduce the price of this article. Many labor-saving machines are introduced to aid in the cultivation of new lands. In a few years, it is probable that ploughing on smooth lands may be effected by steam; and even now mowing and reaping are successfully done by horse-power.

Such are the profits of cultivation, that I would advise all who can, to improve some part of their lands. A small improvement will repay expenditures, and greatly enhance the value of the whole investment.

Three benefits may be expected:

1st. The crops will repay expenses, and yield great profit.

2d. The land cultivated, and the land adjoining, will be advanced several hundred per cent.

3d. If stock is put on the farm, the same may be numerically increased, and greatly enhanced in value, by improving the breed.

Either of these considerations is sufficient to justify cultivation, and guaranty a large return. I might mention the successful cultivation of hay in the west—from one and a half to two tons is a fair crop.—This can be cut and pressed without any labor-saving machines, for $2 per ton; and if the grass was cut by horse-power, the expense would be still less. The profits on one hundred heifers, at $5, might be easily supposed. Fifty breeding sows would probably give seven hundred pigs per annum; and by these means a large farm could be stocked, with little capital advanced.

Hay at New-Orleans varies from $20 to $50 per ton. An average, for the last three years, may be $30 The cost of floating down hay in flat boats, to New-Orleans, may be $8 per ton.

If, therefore, fifteen hundred to two thousand tons of hay could be cut on one thousand acres, would it not be a profitable crop?

There is a practice mentioned by Mr. Newell, and highly recommended by others of putting in hay seed without ploughing the ground. This is done by burning the prairie grass in the spring, and harrowing in the seed. The seed catches quick, and grows well. Blue grass, especially, succeeds, in this way, and the grass will sustain stock all winter without cutting any hay or fodder for them A large drove of horses were kept last winter at Indianapolis on blue grass, on the open fields, at the small expense of $1 per head per month.

From personal examination, I am convinced that ditching and hedging, as practised in Holland, England, and France almost entirely, and now successfully adopted in Illinois, is cheaper than fencing by rails.

The general complaint of the earth crumbling by frost, is prevented by sowing blue grass seed on the sides. Mulberry trees might be raised on the slope of the ditch, with great profit. Indeed, such is the rapid growth of the mulberry in these rich prairie lands, that the purchase of this land at $1 25 an acre, and planted with these trees alone, would in a few years be highly valuable. Such is the extent of the prairie, that wood land will always be valuable for timber. The wood land is also rich, and fine for cultivation; and if trees under certain diameter are cut, a fine grazing farm may be easily made, and the good timber preserved. Similar pastures are found in Kentucky; these yield $3 profit per acre, annually. It may be asked, how can non residents best cultivate their lands? I would remark, that it is customary to rent land (once broke and fenced) for one third of the crops delivered in the crib or barn. At this rent the tenant finds all.

I would advise to employ smart enterprising young men from the New-England States, to take the farm on shares. If the landlord should find a house, team, cart, and plough, and add some stock, he might then require one half the profits of the same. I would advise to allow, for fencing or ditching, a certain sum, and stipulate that the capital invested should be returned before profits were divided. A farmer could in this way earn for himself from $700 to $1,000 per annum, on a lease for five years.

The second year a mowing machine might be furnished, if one hundred acres were seeded down to tame grass. Mast for swine is found in great abundance, and the number of hogs could be easily increased to one thousand, by adding to the number of breeding sows.

Corn is easily raised, that it is found advantageous to turn the hogs into a field of this grain, without gathering it. It has long been the practice in the State of New-York, to raise oats and peas together, and turn in the swine to harvest the same when ripe. Experiments this summer in Connecticut, show a great profit in raising spring wheat and oats together, and feeding out the same to hogs. I have omitted to say, that good bituminous coal is found in the valley of the Wabash. The veins are from five to ten feet thick, and a large wagon load will supply one fire for a year. *Salt* also is manufactured in large quantities, and superior in quality to the Kenhawa salt.

Farmers in Illinois and Indiana are now successfully enclosing their lands by ditching, which has cost from fifty to seventy-five cents per rod.

The laws of the States of Indiana and Illinois, compel the owners of lands adjoining to pay one half of fencing, whenever they make use of, or derive any benefits from the fences of their neighbor. This lessens the expense of fencing one half.

If it be asked, what are the profits of cultivation? I answer, if the land is rented for five years, the profits accruing during this period, will repay the capital advanced in the commencement, with twenty-five per cent. interest per annum, and leave the farm worth $20 per acre at the expiration of the lease. Probably the profit will be much greater.

Yours, respectfully,
H. L. Ellsworth.

Lafayette, Nov. 1836.

Dear Sir—In consequence of the numerous inquiries by yourself, and others, relative to the improvement of wild lands, and especially prairies; the cost of cultivation; the quantity of crops; the market for the same, and the profits that may be expected, I have concluded to write you a general letter, to be used as might be thought proper. My knowledge is founded upon experience, having just completed a farm of eight hundred acres on the wild prairies.

The expense of breaking up the sod, is $2 25. This is a fixed price, and certain calculations may be made on it, wherever the land may be located. But a difference will exist in the cost of fencing, according to the distance the rails are carted. For the farm I have just fenced, the rails were hauled four miles. This distance will form the basis of my calculations. It is apparent that the cost of fencing will depend materially on the size and form of the area to be enclosed. An area of three hundred and twenty acres will cost much more than half of the amount required to fence six hundred and forty acres. The four sides of a half section are three miles; the two longest sides being one mile each, and the two shortest a half mile each. The four sides of a whole section, six hundred and forty acres, are four miles, requiring only *one quarter more fence* for *double* the quantity of land

Twenty rails are allowed to a rod; this makes a "Virginia," or worm fence, eight rails high—the eighth rail (called a rider) being elevated twelve or eighteen inches from the seventh rail, and resting on crotches, (eight feet long,) crossing at each corner of the "worm." Rails of ordinary size, laid in this manner, make a durable and tight fence, over and through which no cattle or stock can pass.

First Estimate for improving six hundred and forty Acres.

Four miles, or 1,280 rods, 20 rails to the rod, gives 25,600 rails.	
Add for enclosures, cribs, &c. 1,400 rails; total of rails is 27,000, which, at $3 50 per thousand, gives	$945 00
For one log house and well, and laying up fence,	200 00
For breaking up six hundred acres, (allowing remaining forty for bad spots, enclosures, &c.,) at $2 25,	1,350 00
Allow for contingencies,	30 00
	$2,525 00

Making not quite $4 per acre, costs, including buildings, &c.

Second Estimate for three hundred and twenty Acres.

Three miles, or 960 rods, at 20 rails per rod, gives 19,200 rails.	
Add for enclosures, cribs, &c. 1,300; total of rails, 21,500, at $35, gives	$752 50
For well, laying up fence and one house,	175 00
For breaking three hundred acres, (allowing remaining twenty for enclosures, &c., at $2 25, gives	676 00
Add for contingencies,	25 00
	$1,628 50

Making near $5 per acre.

The above calculations may vary a few cents per acre, owing to slight fluctuations in price of laborers. One hundred acres will cost about $6 50 per acre, same buildings, &c.; and eighty acres will cost about $8 30 per acre, same buildings, &c.

I have found no difficulty in renting one hundred acres of land, fenced, at $2 50 per acre. The tenant made a handsome sum by the lease. It is common to hire land that is fenced or has been broken up, and give one third of the crop delivered in the crib or barn.

You will perceive the profit on one hundred acres, 40 bushels of corn is a small crop; 75 to 80 bushels a good one; one hundred acres, at 40 bushels, will yield 4,000, one third of which is 1,333 bushels, which, at 25 cents, is $3 33 per acre.—When the canal to Lake Erie is made, the price will be double; 30 bushels of wheat, is a fair crop; one third, 10 bushels, is equal, at present prices, to $12 50—deduct expenses, it will be $6 per acre; one half of the grass crop would be a fair proportion for the landlord, equal to one ton, which will be worth on the land $8, and deduct $1 for pressing, will leave $7 profit per acre, which will be doubled by carrying to New-Orleans.

Many farmers raise a sod crop, by dropping corn in the furrows when ploughing is done; sometimes this succeeds well, but there is too much uncertainty about it to make definite calculations. As a general remark, I would observe, that the first two crops will pay for the land, at government prices, fence the same and plough it, and on 320 acres, build a house worth $200. The land will sell readily at $10 per acre, if improved. Yours, respectfully,

E. A. Ellsworth.

To Hon. H. L. Ellsworth,
Washington City, D. C.

Danville, Nov. 12, 1836.

Dear Sir—

Your favor of August 30th, was duly received; and in answer to your inquiries, I can say, that:

1. "Does your prairie land bear good wheat?" None can hardly be better.

2. "How is the best way to improve prairie land?" By ploughing it in the months of May, June, and July, with a plough peculiar to this country, which cuts a furrow two feet wide, and commonly three

inches deep, upon which sod, corn, oats, wheat, and most kinds of grain, grow well the first year, and with no farther labor in ploughing.

3. "How much wheat, corn, or oats, do you realize per acre?" The first year or so, of wheat, commonly thirty bushels; oats, forty bushels; corn, 30, &c., &c.—The second year more of corn and oats, and not much of wheat.

4. "Do sod crops do well?" They generally are fine, in a good season.

5. "How much grass on an acre?"—I can't say, but over two tons, when well set.

6. "Can blue grass be harrowed in on the turf?" It can, and does well.

7. "Can herds grass also: is this the best way?" It can also, and this is the best way.

8. "Is your country good for hogs?"* Not so good; it is too cold—yet there is good pork made here.

9. "Can you keep cattle on blue grass?" They are kept by some all winter on blue grass, if snow is not too deep.

10. "Is your prairie good for beets?" It is the best for all garden stuff, that I have ever seen, and there can be none better.

11. "Is there coal near you?" The coal beds here are inexhaustible; they are found almost on every considerable creek, and perhaps as much in Vermillion county, as any in Illinois.

12. "What is the price of cattle now?" About $4 per cwt., and higher now than formerly, owing to the great emigration and demand for them; and from the rapid settlements, they will not be lower, most likely, for years.

13. "How do ditch and turf fences do?" As yet, I have seen none upon the right plan; but a ditch and sod sown with blue grass, I have no doubt will answer every purpose, instead of fence.

14. "What is the comparative expense of rail fence and ditching?" That depends upon the distance you haul the timber.—But ditching may, by proper arrangements, be done cheap.

You ask me farther, whether I can furnish blue grass seed? I can, to the amount of sowing two hundred acres per year, price $1 per acre. This seed can also be got at Louisville and Cincinnati.

You have the goodness to say, that I may add any information in my possession. I do it cheerfully, believing that we have one of the finest countries in the United States. My experience here in farming has been not inconsiderable.

The prairie grass is an excellent substitute for tame grass, if it is well cured, and cut early. This grass, early in the spring, is equal to any pasture in the old States, and some have said better; but when it becomes hard, in August and September, it is of little or no account. A man and two horses can plant and tend forty acres of corn on the prairie, when the sod is well rotted; and, as an average crop, there will be fifty bushels per acre, and sometimes more. Oats grow finely, and yield from fifty to seventy bushels, on ground well tended. I think, also, there is no country superior to ours for hemp and tobacco; at least, none of the southern states in which I have been.

Sheep do as well here as in Kentucky, even on the prairie grass. I need hardly add, that this country is peculiarly adapted to the raising of mules, horses, and cattle, and they can be raised cheaper here than any state in which I have been, fifty per cent. at least I will say.

Fruit trees that I have tried, have grown remarkably thrifty, and, perhaps, faster than in most countries—which is the case of all trees. I have grown, from the seed, black and honey locust, sugar and walnut trees, ash and hickory—that of nine years' growth, is nine inches in diameter. My pear trees, about nine inches long when planted, produced fruit the sixth year.—My apple trees, from the seed, produced the fifth year; and some of the trees this year, (the ninth year yielded me twenty bushels to the tree. I will not forget to mention, that flax also is luxuriant in its growth here.

You have said that you have the sugar beet seed, and proffer to send me a few, which will be most acceptable. I would like some of the hedge thorn for experiment also.

I live adjoining your land, and have eight persons in my family, and during this, and for years past, have had none sick in my family. This perhaps, comprises all you may wish to know about our delighted country.

I have the honor of being yours, &c.,

JAMES NEWELL.

To Hon. H. L. Ellsworth,
Washington City, D. C.

We are truly obliged to the writer of the following communication, and our readers, certainly cannot be less so; as the facts therein given may be implicitly relied upon, and are of deep interest to every practical farmer. We take M. at his promise, and give him notice that we shall often draw upon him for the results of his experience, and trust that our drafts will not be "protested for non-acceptance." If *accepted* we ask no *endorser*.

It will afford us great pleasure to aid him in "*hammering*" out the *truth* of such vast importance, into the brain of every wool grower or sheep raiser in the country.—[Eds. N. Y. F.

MANAGEMENT OF SHEEP.

Messrs Editors,—I have long since desired to contribute something useful to the columns of your valuable journal, which is the privilege and duty of every subscriber. Many are doubtless deterred from so doing, by the same reason which has influenced myself, viz., because they have nothing novel to communicate. I have discovered that novelty is not always associated with utility, and therefore, after due reflection, I am convinced I cannot better subserve the purposes for which your journal was established, than in this communication, bear my testimony in favor of something already known, of the highest importance, and of undoubted advantage, in every point of view, to all who practice it. I refer to the housing and protection of sheep, during the winter. This a trite subject Messrs Editors, but it is one, which will bear more hammering than you are aware of; and if it were possible to hammer it into the brains of every wool grower, I should congratulate myself as one of the greatest benefactors of the age.

Much has been published on the improvement of the breed of sheep, the best modes of keeping &c., but I fear to very little purpose. I have sometimes thought, that our great freedom as a nation, had an unfavorable influence upon private character, and is in some degree injurious to individual improvement. Every man as soon as he slips "his leading strings" is proud of "going upon his own hook," this is frequently a sort of independance of thought and action, which is too apt to degenerate into self-sufficiency and conceit of our own superior knowledge. These remarks are particularly applicable in my opinion, to the great majority of farmers. Almost every man you meet with, in these days, is disposed to consider his own kind of stock best, his system of tilling best, and his every thing in regard to management better than his neighbors. All experience and observation prove, that when a man thinks he has arrived at the point of perfection, and he begins to retrograde. This spirit of of self-sufficiency is fatal to all improvement. The rapid strides which agriculture is making towards perfection, renders it ridiculous for any one to say "my system is best, I know enough already, and will follow in no man's track." In my opinion, we all ought to consider, that in this country, the great science of agriculture is yet in its infancy, and loudly applaud every experiment that is made to develope the wonderful, and still hidden, resources of our soil. I am not, however, myself disposed to bow to every theorist and innovator, whether in religion, politics, or farming, but where experiments are based on common sense, and conducive to profit, I am ready for one, to adopt them. How much valuable information and solid advice have been tendered through the medium of your journal, which, if followed, would have increased our gains

---

* Reference is here made to the *prairies*, which have no shelter for hogs. In the woods adjoining, hogs live all winter on mast, and thrive well. The Wabash valley is famous for its hogs. I have kept a large herd of swine this past summer on the prairie. Timber will soon be planted, or sheds built, and then pork can be most easily raised on these lands.—H. L. E.

some ten, some twenty, and some an hundred fold!! yet this spirit of self-sufficiency rejects the experience of others, and rests satisfied with pursuing the beaten track of our grandfathers.

These observations have been deduced, not only from my own experience but those around me. I will now proceed to give you briefly the manner of managing my flock of sheep.

Until within two years, I have committed the abominable sin of allowing my flocks to be fed during the winter, about stacks, without any protection from the pitiless storm, and when I look back on the years and years which I did so, and recall their sufferings and death from exposure, it is really with shame and confusion of face that I make it known. I have, however, put a stop to so inhuman a course and a cordingly set about building barns, in size 30 by 20 feet, 14 feet posts leaving an opening underneath, of 4½ feet from the ground. I have found the body of each building sufficiently large to contain hay enough, in an ordinary winter, for 100 sheep, and the accommodation or shed part ample for that number. All of them front the south with a passage way of some 8 or 10 feet wide, which is at all times open, and leaves them free to go in and out at pleasure. About the barns, which stand on my meadows, I have created board fences, made close, which, when feeding, afford great protection from winds; as regards the size of the yards, never having measured them, I am unable to say; but 60 by 100 feet is large enough. My hay is fed in boxes, with opening at the ends and sides, sufficiently wide for the admission of their heads. Some of your readers may smile when I inform them, that this is the first winter I have made use of boxes; this, however, it the fact, and such I have discovered in the saving of hay, that hereafter I shall 'veto' open racks, or scattering hay on snow or ground.

What is left in the boxes, every morning, is taken out, put in a pen until full, and then drawn away and fed to my cattle. Herein is great economy—the waste of feeding on the snow or ground, every practical farmer knows.

Raising a large crop of wheat yearly I am supplied with great abundance of straw, which is used partly for beds, and scattered about the yards—much of it, in cold weather, sheep will eat, and the residue is turned into manure. By the way, I think this a capital mode of disposing of straw, as it is soon cut up by being constantly trampled upon, and thereby converted into immediate use, without the delay of rotting.

From the beginning of winter to its conclusion, I feed daily to my last spring lambs, half a bushel of clean oats to the 100, a mixture of bran and oats I think preferable however, inasmuch as in the beginning of winter, oats alone is rather too stimulating and will occasion some to scour—the bran effectually counteracts it. Where bran cannot be obtained, feeding half the above quantity of oats, for the time of two or three weeks will answer.

I will here remark, that I have uniformly realized the greatest advantage in graining my lambs. Out of nearly 500, up to this time (middle of March) I have not lost one. It must be obvious to all, that with a view to promote growth and a good constitution, with any description of stock, feeding when young, and keeping up good condition, is of the highest importance.

To my full grown sheep, I have, until this winter, fed the same quantity of grain to the hundred, that I do to my lambs. They now look as well as when they were grained—but, it is almost solely to be ascribed to the protection which has been afforded them. It is my practice to give hay tiwce a day to all my sheep in ordinary weather, and when very cold, three times. So much for reference to my winter economy.

I am a firm believer in the good old maxim, "that stock well summered are half wintered," and to this end, my farm is divided into fields of from eight to fifteen acres each. I allow a flock to remain but a few days on a field, when they are changed to another. By so doing, the grass is not eaten too short, readily grows again, and the effects of fresh pasture so frequent during the summer, your readers can easily conceive.

As my object in this communication was to make known, in some degree, my own mode of management of sheep, but more particularly to add my testimony of the benefits to be derived from housing sheep during the winter, I will state some facts, which will lend additional weight.

Until the erection of my barns, it has been my misfortune to lose from 50 to 150 sheep every winter for the last eight or ten, notwithstanding the advantages of feeding oats and bran. The severity of last winter, all will readily remember; yet in consequence of the protection my sheep enjoyed, my loss was only 38 out of nearly 1600. My loss during this winter up to this period (as above stated) is only 6; my whole number of sheep at present is about 1800.

I will now record the loss of some of my neighbors, during the last winter, in the adjoining Co., (Cayuga,) none of whom had barns, sheds, or hovels provided for their flocks. One individual out of a flock of 1400, lost between 600 and 700—another, out 2000, lost nearly 400—another, from a flock of 1500, lost between 200 and 300, and the loss was nearly in the same proportion, with few exceptions, throughout this region!!

These are startling facts, and would seem not to require a word of comment. Will not humanity almost blush? That men will so utterly disregard their own interest is truly astonishing! They will make all needful arrangement for their horses and cattle, and get so absolutely neglectful of the comfort and benefit of that, to me, most interesting of all domestic animals—sheep. Every one would naturally suppose that the above, who sustained such losses, would arouse themselves and prevent the recurrence of such devastations, by providing some sort of shelters—but no—to my certain knowledge not one of them have raised a finger to do it.

Will not my preparatory remarks apply to these and all others who do likewise? I called it self-sufficiency—it is more—it is downright inhumanity: a treatment they are not guilty, even to their dogs. But I shall leave your humane readers to apply the lash. But one word more—these are the very kind of farmers, referred to, who regret all experiments, all experience of others—who have arrived at the goal of perfection—they will tell you "*that housing of sheep is injurious to their constitutions*"—that they *know* their system of management is better than their neighbors. Have I not, Mr. Editors, proved conclusively that when men think—nay more—*know* they have arrived at the point of perfection; that moment they retrograde. "The beginning of wisdom is to know our own folly."

M.

Lansing, Tompkins Co., N. Y.

Improved Corn.—We take the following correspondence from the Newark (N. J.) Daily Advertiser, and commend it to our readers, as well worthy their attention. We have no doubt of the correctness of the theory that a selection of the fairest and largest of the crop for *seed* will produce a superior article; and that perseverance in that course will richly reward the husbandman.

Improving common Seed-Corn.—The following interesting correspondence has been furnished to us for publication by the Hon. *James Parker*, as containing information that may be useful to the Agricultural community. Mr. Ellsworth's circular was addressed to each member of Congress, with a sample of the corn of which Mr. Baden's letter speaks. We see no reason why his theory is not equally applicable to other seeds. It is certainly worthy an experiment—

Patent Office, Jan. 30, 1837.

Sir: Hearing of some great improvements that had been made in the common

corn, I addressed a letter to Mr. Baden, a highly respectable gentleman in Maryland, to ascertain what facts I could on the subject.

His letter is very interesting, and I transmit you a copy of it. This experiment of Mr. Baden shows most clearly what can be done to *improve seeds, by carefully selecting each year the best kind raised.* Theoretical opinions sustain Mr. Baden: but few experiments have been tried so successfully. What might be effected for agriculture by similar efforts.

The like efforts in improving the breed of animals have been crowned with great success, especially in Europe. I avail myself of this opportunity to send you a small sample of the corn mentioned by Mr. Baden. I will only add, that I have conversed with several persons who have planted the "Baden" corn; and the concurrent opinion of all sustain the statements made in the letter. I have a few samples at the Patent Office, of corn, raised in this neighborhood which has four and five ears on a stalk; and I expect soon some stalks, containing six, seven and eight ears. If this corn were generally introduced, how greatly the amount of bread stuffs might be increased, *without any extra labor.* I hope some public spirited citizens will try to improve wheat, oats, barley, and other grains.

I avail myself of the opportunity to mention the introduction of the Italian *spring wheat* with great success. A friend of mine, in Connecticut, raised the last year forty bushels on an acre. This grain is heavy; makes good flour; yields well; and the crop avoids all the danger of winter freezing. I have ordered a quantity of this corn and wheat to be shipped to Indiana, and intend to try both on the fine soil of the Wabash valley, the ensuing summer.

I am, yours, very respectfully,

HENRY L. ELLSWORTH.

N. B. Be careful to plant this corn in a place by itself. When good seed is planted in a field with poor seed, the former will degenerate.

H. L. E.

[Copy of Mr. Baden's Letter.]

NEAR NOTTINGHAM, PRINCE GEORGE'S Co., Maryland, January 26, 1837.

Sir: I received yours of the 14th, making inquiry respecting the "*Maryland Corn,*" which you understood I had raised. I have the pleasure to say that I have brought this corn to its high state of perfection by carefully selecting the best seed in the field for a long course of years, having especial reference to those stalks which produced the most ears. When the corn was husked, I then made a re-selection, taking only that which appeared sound and fully ripe, having a regard to the deepest and best color, as well as to the size of the cob. In the spring, before shelling the corn, I examined it again, and selected that which was the best in all respects. In shelling the corn I omitted to take the irregular kernels at both the large and small ends. I have carefully followed this mode of selecting seed corn for *twenty-two or twenty-three* years, and still continue to do so. When I first commenced, it was with a common kind of corn, for there was none other in this part of the country. If any other person undertook the same experiment, I did not hear of it; I do not believe others ever excised the patience to bring the experiment to the present state of perfection. At first, I was troubled to find stalks with even *two good ears* on them, perhaps one good ear and one small one, or one good ear and a "nubbin." It was several years before I could discover much benefit resulting from my efforts; however, at length the quality and quantity began to improve, and the improvement was then very rapid. At present I do not pretend to lay up any seed without it comes from stalks which bear four, five, or six ears. I have seen stalks bearing eight ears.

One of my neighbors informed me that he had a single stalk with *ten perfect ears on it,* and that he intended to send the same to the muscum at Baltimore. In addition to the number of ears, and of course the great increase in quantity unshelled, it may be mentioned, that it yields much more than common corn when shelled. Some gentlemen in whom I have full confidence, informed me they shelled a barrel (ten bushels of ears) of my kind of corn, which measured a little more than six bushels.—The common kind of corn, will measure about five bushels only. I believe I raise *double or nearly* so, to what I could with *any other corn I have ever seen.* I generally plant the corn about the first of May, and place the hills five feet apart each way, and have two stalks in a hill. I can supply you with all the seed you may need, and I suppose I have now in my corn house fifty and perhaps more, stalks with the corn on them as they grew in the field and none with less than *four,* and some *six or seven,* ears on them. I will with pleasure send you some of these stalks, and also some seed corn, if I can get an opportunity.

Early last spring I let George Law, Esq. of Baltimore city, have some of this seed corn; he sent it to his friend in Illinois, with instructions how to manage it. A few weeks since he informed me that the increase was *one hundred and twenty bushels on an acre;* that there was no corn in Illinois like it, and that it produced more fodder than any other kind. I have supplied many friends with seed corn, but some of them have planted it with other corn, and will, I fear, find it degenerate.

I have lately been inquired of if this corn was not *later* than other kinds? It is rather *earlier;* certainly *not* later. Corn planted in moist or wet soils will not ripen so quick as that which is planted on a dry soil. In the former, there will be found more dampness in the cob, although the kernel may appear equally ripe in both. In the two last years, the wet seasons have injured much corn that was too early "lofted" or housed.

I believe I have answered most of your inquiries. I hope I have not exaggerated—I have no motive for doing so. I raise but little corn to sell, as tobacco is my principle crop. Should I fail to send you some seed this spring, I will next summer gather some stalks with the corn, fodder, and tassels, and all, as they grow, and send to you, that you may judge yourself of the superiority of this over the common kind of corn.

Yours, &c.

THOMAS N. BADEN.

Hon. H. L. ELLSWORTH,
Commissioner of Patents, Washington city.

From the New-York Farmer.

GENTLEMEN:—It was my intention to have sent you the following communication, on the subject of planting Trees. long since; but through untoward circumstances the time has escaped and the season for making such improvements is almost here; however, as it is never too late to do good, I send it to you, and it is at your disposal.

Cold Spring, March 1837.

RICHARD M. CONKLIN.

As the winter months roll slowly along, and spring impercepibly approaches, it is natural for the farmer while he enjoys his fire-side, to consider what he should first direct his attention to, in the way of improving his paternal acres, when that period arrives. Among the most prominent objects is the planting of trees; which may be done as soon as the frost releases the earth from its iron grasp, and nature revives from her death like sleep.

To the farmer who possesses a taste for the beautiful scenery of the country, I hardly need say how much it adds to that scenery, if it is embelished by snug dwellings, whose velvet lawns and gentle slopes are ornamented with trees, offering a cool retreat from the noon-tide heat. But alas! how often in our walks do we see the habitation of the farmer standing exposed to the burning rays of the sun, with not a single tree to offer its grateful shade, or relieve the eye with its green and refreshing verdure. It is indeed a charming sight, when the hills begin to extend their lengthened shadows and their purple peaks are illuminated by the parting rays of the sun, to look from an eminence into a quiet vale and behold the curling smoke arise from neatly painted or whitewashed cottages; but how much is added to the scene, if the white fronts of those cottages should peep from among trees, planted by the hand of industry and taste. The delightful fragrance too of many of our ornamented trees and shrubs is a sufficient reward for all the tronble and expense of planting. But, as I am addressing myself to that class in our community who are, in a good degree, obliged to make pleasure and profit go hand in hand, it will not be amiss to say that nearly all the varieties of fruit bearing shrubs and trees are both profitable and ornamental, and by no means deficient in fragrance. The grape vine for all of the above qualifications is conspicuous.

The highways are susceptible of being ornamented too, by the planting of trees, they offer to the weary traveller a resting place by the way side, while he may repose until his exhausted frame is renovated.

For the last mentioned purpose, the yellow locust is admirably adapted, in a favorable soil it grows rapid, stands erect, and

when in flower is a beautiful and fragrant tree: indeed the importance of this tree as a matter of profit, induces me to urge upon the young farmer the necessity of attending to it in season. There are but few farms which will not, upon examination, furnish many waste places for the introduction of this valuable timber. There are many however, who live years on their farms without making the least effort toward this improvement, under the impression that perhaps they may never live to see the trees grow up large enough to be valuable. In reply to such objections I would observe, that should the farm pass from necessity out of the hands of the original owner, after he had improved it in the manner above named, yet it would command a much greater price; but on the contrary, should he hand it down to his posterity, surely it would afford him much more satisfaction in the evening of his days to reflect, that, instead of letting the golden moments escape, he had seized the opportunity and laid the foundation for a valuable inheritance for his children.

About ten years since I came into sole possession of a farm which consisted of one hundred and forty acres of land, twenty of which were hilly wood-land; the rest, excepting four acres of wet meadow or swamp, was arable. On looking about I found many waste places in the woods, along the roads, lanes, and fences where I could introduce locust trees. I accordingly set to work, and planted out at least five thousand. Many of these were set in the woods where the timber had been lately cut off: these are growing rapidly, and nearly all of them in a few years will be valuable timber. By replacing those which died the number probably had been kept good. It has been found by observation that locust on Long Island, from the time of planting until grown to sufficient size for timber, averages in yearly growth twelve and a half cents per tree. A few years since I sold a tree which had grown upon an average, sixty-two and half cents per year. The tree was sold as it stood, and the age was ascertained by counting the circles exhibited on the stump after sawing it off; according to which the tree had stood fifty years.

If locust timber grows in value as I have stated, and the farmer plants on a farm of one hundred and fifty or two hundred acres, five thousand trees in favorable places, those five thousand trees at the end of twenty-four years will be worth sixteen thousand dollars: no ignoble sum for a man to realize from the planting of trees.

Before I leave this subject, I feel it as an imperious duty to caution the public against purchasing seed in the city of New-York, and other places sold under the name of yellow locust seed; by far the greater part of this seed is a spurious kind; and some of the most noted seed stores in New-York have furnished a goodly quantity of this degenerate article.

At some more convenient time I will give my readers at large against the planting of the above mentioned seed, at present I will conclude by pointing out the visible difference between the genuine and the above mentioned spurious kind of locust, which will be nearly as follows, viz.

1. A proneness to branch into equilateral shoots.

2. An inclination to bear seed in pods nearly as large as some of our garden beans. so that a tree of two inches in diameter is frequently loaded with them.

3. The heart wood instead of being yellow exhibits a blue tinge.

4. The grain of the wood is not straight, or easily riven, but appears stringy and tough.

5. In seasoning it inclines to shrink and split.

R. M. Conklin.

Soap Making.—The subjoined is from a friend as well skilled in all matters of domestic economy and household management, as any one I have ever known.

H. C.

The last Soap I made, we used 20 lbs. of potashes and 25 lbs. of grease to a barrel; and it made excellent soap. Success much depends on having the best quality of potashes. I have a set-kettle in which I dissolved the potashes and put it into the trough in which we keep the soap; then melt the grease and put to it, the mass is then hot; having conveniences for heating the water, I have generally filled it up keeping the whole hot; by this means the ingredients incorporate quickly; and I have had but little to do after the first day. But I do not add the whole of the water at once. I prefer doing it by degrees, and stirring well at each time. There will be no difficulty, if you have good materials; and get them tho roughly incorporated. I have no doubt it may be effected as surely with cold water after the ingredients are mixed and put together; but it will require longer time and more labor to stir it. I have been troubled a little once or twice by getting weak potashes; and have been obliged to add more, but have always succeeded in the end.—Once I recollect I put more potashes than usual, and it was too powerful. I then added more grease and water and reduced it; the above proportion, I think, is about right, if the materials are good; if the potashes should prove otherwise, more may be added.—[Brookline.] B. G.

Wilmot's Early Rhubarb.—To those who cultivate the Rhubarb, we would earnestly recommend the Wilmot's Early, before any other variety. We have seen it this season at Mr. Pond's garden in Cambridgeport, two inches high. The growth is very rapid. This is a plant which every body may cultivate. The fruit is considered a delicacy, and medical men ascribe to it a salutary effect, particularly upon children. Four roots are enough to supply a family.

From the Mechanics' Magazine.

PROCEEDINGS OF THE MECHANICS INSTITUTE OF THE CITY OF NEW-YORK.

The weekly Tuesday Evening Scientific Meetings heretofore held in the Lecture Room of the Institute, will be re-opened on Tuesday Evening the 9th inst., at 8 o'clock, by a lecture from Mr. Hodge, on machine and other drawing. N. B. Mr. H., proposes opening a drawing-school in the Rooms of the Institute, should sufficient encouragement be given.

Chemical examination of the stomachs of two individuals supposed to have been poisoned by Arsenic—being the substance of a paper read before the Mechanic's Institute of the city of New-York, August 1836, by James J. Mapes, Esq.

No. 1. In the first case the coats of the stomach only were subjected to examination. They were cut into small fragments and subjected to the action of distilled water, at a temperature of 212°, for 3 hours.

To a small portion of the solution was added ammoniacal nitrate of silver; a bulky yellow precipitate fell down, which afterwards changed to a reddish brown, and was inferred to be a phosphate combined with animal matter; for had it been arsenite of silver it would have precipitated more rapidly, and presented a more decided color.

To a second portion of the solution, ammoniacal sulphate of copper was added to precipitate the arsenic, if any, in the form of an insoluble arsenite of copper, (scheele's green) a slightly green precipitate was formed, but of a doubtful character. This test, as well as the last, is entirely circumstantial; for common salt, onions, garlic and some other substances would, if recently partaken of by the deceased, have produced the same effect.

A third portion of the solution was subjected to the action of sulphuretted hydrogen, but no precipitate was formed.

A portion of the stomach apparently much inflamed, having been previously removed, was carefully dried to expell all the water, and to decompose the animal matter, was heated with black flax in a glass tube for the reduction of the arsenic, if any, in the metallic state: but no metallic ring, garlic, odor or white vapor appeared. On throwing the contents on burning coals,—an effect that is uniformly produced when metallic arsenic is converted to an oxide, or the oxide converted to the metallic state by means of heat; but even this odor is not conclusive evidence, as zinc is capable of producing the same odor. The metallic ring of arsenic, however, is considered as the best evidence we can have, amounting as it does to demonstration.

No. 2. Stomach with some of the contents was boiled as No. 1, in distilled water

for three hours. The water in this case was slightly acidulated with nitric acid; the solution was filtered and evaporated to dryness, to drive off the nitric acid, re-dissolved and filtered, to get rid of the animal matter.

To a portion of the solution ammoniacal nitrate of silver was added; and to another portion was added the ammoniacal sulphate of copper, with results similar to those in No. 1. A third portion of the liquid was subjected to the action of sulphuretted hydrogen, which threw down a yellow precipitate. This precipitate being dried and heated with black flax in a glass tube gave none of the usual indications of arsenic.

As the two stomachs were brought to me preserved in alchohol, a liquid which is capable of taking up considerable quantity of arsenious acid, I filtered and evaporated, the solution; occasionally adding distilled water until the alchohol was entirely evaporated. With the ammopiacal nitrate of silver, the precipitate was quite characteristic; with the ammoniacal sulphate of copper it was too white and gelatinous; with the sulphuretted hydrogen the precipitate was too dark for the sulphuret of arsenic, this product on being dried and heated with black flax, gave no indication of metallic arsenic.

From the above experiments, I feel assured that no arsenic was contained in either of the stomachs above mentioned, their contents, or in the alcohol which preserved them, as both the circumstantial and positive tests would have detected, the one hundredth part of a grain had it been present.

The fact that no arsenic was found in the stomach, does not, however, prove that arsenic was not the cause of death; and especially, as the deceased vomitcd much and for a considerable time. The patient might have died either from the immediate or from the after effects of the poison, though none of this mineral was found. Had the patient died from the after effects, the arsenic would have been indicated by the inflamed state of the inner coat of the stomach, which would have been covered with red spots; and such was, indeed, the case. It is highly probable, therefore, tht the arsenic had been entirely removed from the stomach, by vomiting, before death.

There is a case of the same kind recorded in the Philadelphia Journal of Pharmacy, for July, 1834. The case was examined by Doctors James B. Rogers, Geo. W. Andrews and Wm. R. Fisher.

A lady was poisoned by arsenious acid, in soup, and died the same day, having vomited much. On examining the stomach and contents, not the slightest trace of arsenic was perceptible; but from a portion of soup that had been saved, it was obtained in abundance, by every test that was used. Doctors Prout and Christison, and Prof. Braude, have also cited cases similar to the above.

Advertisement.

TO CONTRACTORS.

JAMES RIVER AND KANAWHA CANAL.

THERE is still a large amount of mechanical work to let on the line of the James River and Kanawha Improvement, consisting of twenty locks, about one hundred culverts and several large aqueducts, which will be offered to responsible contractors at fair prices.

The locks and aqueducts are to be built of cut stone.

The work contracted for must be finished by the 1st day of July, 1838.

Persons desirous of obtaining work are requested to apply at the office of the undersigned, in the city of Richmond, before the fifteenth of May, or between the fifth and the fifteenth of July.

CHARLES ELLET, Jr.
Chief Engineer Jas. Riv. & Ka. Co.

P. S.—The valley of James River above Richmond is healthy.

16—10t

PATENT RAILROAD, SHIP AND BOAT SPIKES.

*** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

*** All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.
Troy, N. Y., July, 1831.

*** Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes. (1J23am) H. BURDEN.

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers having formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendant and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be promptly attended to, and ropes will be shipped to any port in the United States.

12th month, 12th, 1836. Hudson, Columbia County State of New-York.

ROBT. C. FOLGER,
33—tf. GEORGE COLEMAN,

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do plain do
150 do do do caststeel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed,) manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York.
BACKUS, AMES & CO.
No. 8 State street, Albany

N. B—Also furnished to order, Shapes of every description, made from Salsbury refined Iron v4—tf

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroads.

No. 264 Elizabeth street, near Bleecker street, New-York.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlaem Railroad now in operation J25tf

FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the right to others to build, on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build, and furnish all materials for superstructures of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington, two miles from the former place. Across the Metawaunkeag river on the Military road, in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Rrailroad at three points. On the Hudson and Patterson Railroad, in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Souhegan river, at Milford, N. H. Across the Connecticut river, at Haverhill, N. H. Across the Contoocook river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesse river, at Squakiehill, Mount Morris, New-York. Across the White River, at Hartford Vt. Across the Connecticut River, at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Cataraugus Creek, N. Y. A Railroad Bridge diagonally across the Erie, Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the FIRMEST WOODEN BRIDGE ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms. MOSES LONG.

Rohester, Jan. 13th, 1837. 4—y

ARCHIMEDES WORKS.

(100 North Moor street, N. Y.)
NEW-YORK, February 12th, 1836.

THE undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

4—vtf. H. R. DUNHAM & CO.

MACHINE WORKS OF ROGERS KETCHUM AND GROSVENOR, Paterson, New Jersey.

The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

RAILROAD WORK.

Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires; Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron; Springs; Boxes and Bolts for Cars.

COTTON WOOL AND FLAX MACHINERY,

Of all descriptions and of the most improved Patterns, Style and Workmanship.

Mill Geering and Millwright work generally; Hydraulic and other Presses; Press Screws; Callenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR
Patterson, New-Jersey, or 60 Wall street, N.
5 1tf

ALBANY EAGLE AIR FURNACE AND MACHINE SHOP.

WILLIAM V. MANY manufactures to order IRON CASTINGS for Gearing Mills and Factories of every description.

ALSO—Steam Engines and Railroad Castings of every description.

The collection of Patterns for Machinery, is not equalled in the United States 9—1y

NOTICE TO CONTRACTORS. WESTERN RAILROAD.

PROPOSALS will be received at the office of the Western Railroad Corporation, in Springfield, until the 10th May, for the grading and masonry of the second and third divisions of the road, extending from East Brookfield to Connecticut river, at Springfield—a distance of 35 miles.

Plans, Profiles, &c. will be ready for examination after the first of May. W. H. SWIFT,
Resident Engineer
Worcester, Mass., April 1, 1837. 14-6t

NOTICE TO CANAL CONTRACTORS.

SEALED proposals will be received at the office of the Commissioners of the Illinois and Michigan Canal at Chicago, from this day to the 20th May next for the construction of about eight miles of that part of the summit division of the said Canal, lying between the Chicago and Desplaines River.

Also about three and a half miles of the same division, lying between the Saganaskee Swamp, and the western termination of the said division. And also about twelve miles of the Western division, lying between the Grand Rapids of the Illinois and the western termination of the Canal.

The two first portions offered for contract, are heavy work, the first deep earth excavation, divided into half mile Sections, the second mostly rocks, and divided into thirty chain sections; the third consisting of light earth excavation, a little rock and embankment, and is divided into forty-two chain sections.

No bond with security will be required of the Contractors, but the Commissioners will avail themselves of the powers granted them of awarding the contracts to the lowest responsible bidder, and it is expected that the bids of all those who are not personally known to the commissioners will be accompanied with the proper testimonials. And upon the award of work, it is expected that the parties will immediately enter into written agreements, or the contracts will be forfeited.

Plans, profiles, and specifications, giving all the necessary information, may be examined at the office of the Canal Commissioners, at Chicago, and those wishing to obtain contracts on this work, are requested to make a minute personal examination of the work previous to sending in their proposals.

Attest, J. MANNING, Secretary.
Chicago, March 24th, 1837. 16—3t

TO RAILROAD CONTRACTORS.

PROPOSALS will be received, at the office of the Hiwassee Railroad Com., in the town of ATHENS, TENNESSEE, until sunset, of Monday, June 12th, 1837; for the grading, masonry and bridges, on that portion of the HIWASSEE RAILROAD, which lies between the River Tennessee and Hiwassee. A distance of 40 miles.

The quantity of excavation will be about one million of cubic yards.

The line will be staked out; and, together with drainings and specifications of the work, will be ready for the inspection of contractors, on and after the 1st day of June.

JOHN C. TRAUTWINE,
Engineer in Chief Hiwassee Railroad.
16—6t.

RAILWAY IRON, LOCOMOTIVES, &c.

THE subscribers offer the following articles for sale.

Railway Iron, flat bars, with countersunk holes and mitred joints,

						lbs.	
350 tons	2½	by	½,	15 ft in length, weighing		4 68/100	per ft.
280	" 2	"	½,	"	"	3 50/100	"
70	" 1½	"	½,	"	"	2½	"
80	" 1½	"	½,	"	"	1 25/100	"
90	" 1	"	½,	"	"	½	"

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 13 feet 2½, 2¾ 3, 3½, 3¾, 3¾, and 3¾ inches diameter.

Chains for Inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand flax.

Also Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and ston block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer, resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron &c. ordered through us

A. & G. RALSTON & CO.,
28 tf Philadelphia, No. 4, South Front st.